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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,310	01/22/2002	Hamid Noorbakhsh	4150D1/ETCH/DRIE/JB1	9294
32588	7590	03/09/2006	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	
DATE MAILED: 03/09/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/055,310

Applicant(s)

NOORBAKSH ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-26, 28-33 and 35-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-26, 28-33 and 35-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/22/05 has been entered.

Claim Objections

Claim 18 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 18 fails to limit the independent claim because the magnet being located within the cylindrical wall is already disclosed in independent claim 11.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13, 16-17, 19, 21, 33, 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13-lines 4-6 and claim 16-line 1, the phrase "the passage" lacks antecedent basis. For examination purposes, it is assumed that claims 13 and 16 depend on claim 12.

In claim 17-line 1 and claim 19-line 2, it appears that "the lip" is the same as "the second protrusion" disclosed in claim 11-lines 12-13. Clarification is requested.

Claim 21 recites the limitation "the process volume" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 33 recites the limitation "the second cylindrical wall" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 11, 15, 17-21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Collins et al., EP 0 807 953 or Loewenhardt et al., U.S. Patent 6,030,486.

Shan et al. shows the invention as claimed including a thermally controlled apparatus for lining a processing region defined at least partially by cylindrical sidewalls, a substrate support 18, and a bottom of a processing chamber, comprising: a liner 10 for lining the sidewalls of the chamber and adapted to be removably disposed in the processing region and having an aluminum base for substantially covering the bottom of the processing chamber and wherein the liner further comprises: an outer cylindrical wall contacting an outer edge of the base for extending into the processing region along the sidewalls, the outer cylindrical wall having a first lip/protrusion 14 spaced above the base; and an inner cylindrical wall connected to an inner edge of the base for extending into the processing region along the substrate support, the inner cylindrical wall having a second lip/protrusion 16 located opposite the first protrusion.

Shan et al. does not expressly disclose a magnet located in the second protrusion on the inner cylindrical wall of the liner. Collins et al. discloses the use of

magnets 80/82 in walls of the apparatus for plasma confinement (see fig. 4A and its description). Alternatively, Loewenhardt et al. also discloses the use of magnets 80 for plasma confinement (see figs. 4A-4B and their descriptions). In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. as to further comprise a magnet disposed in the second protrusion in order to confine the plasma to the chamber.

Claims 12, 14, 16, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Collins et al., EP 0 807 953 or Loewenhardt et al., U.S. Patent 6,030,486 as applied to claims 11, 15, 17-21, and 23 above, and further in view of Lee, U.S. Patent 5,616,208 or Masuda et al., U.S. Patent 6,171,438.

Shan et al., Collins et al., and Loewenhardt et al. are applied as above but do not expressly disclose wherein a passage is formed at least partially in the base and the passage is adapted to fluidly isolate a heat transfer fluid flowing through the base. Lee discloses using an annular heat medium passage (123,129) formed so as to prevent deposition on the surfaces exposed to plasma, wherein the passage is formed at least partially in the base and the passage is adapted to fluidly isolate a heat transfer fluid flowing through the base (see fig. 1 and its description). Alternatively, Masuda et al. discloses an apparatus comprising a liner 103 having a heat exchanging medium supply means 104 to control the temperature of the side wall 102. In view of these disclosures,

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it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Collins et al. or Loewenhardt et al., by supplying a heat transfer medium through the liner because this allows for the formation of a strong polymerized film on the exposed walls and reduces instances of flaking or, alternatively, so as to control the temperature of the surfaces exposed to the gases (plasma) because this will prevent the deposition of by-products on the exposed walls.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Collins et al., EP 0 807 953 or Loewenhardt et al., U.S. Patent 6,030,486 and Lee, U.S. Patent 5,616,208 or Masuda et al., U.S. Patent 6,171,438 as applied to claims 12, 14, and 22 above, and further in view of Reimold et al., DE 31 10489 A1.

Shan et al., Collins et al., Loewenhardt et al., Lee, and Masuda et al. are applied as above but do not expressly disclose the use of bosses. Reimold discloses the use of bosses for providing connection for the supply or the removal of a heat exchanging medium (see equivalent abstract). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use bosses in the apparatus of Shan et al. modified by Collins et al. or Loewenhardt et al. and further modified by Lee or Masuda et al. in order to provide connection for the supply and removal of the heat exchanging medium.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Collins et al., EP 0 807 953 or Loewenhardt et al., U.S. Patent 6,030,486 as applied to claims 11, 15, 17-21, and 23 above, and further in view of Banholzer et al., U.S. Patent 5,565,058.

Shan et al., Collins et al., and Loewenhardt et al. are applied as above but do not expressly disclose that the liner comprises a textured surface. Banholzer et al. discloses a vacuum chamber comprising a liner that is treated to roughen its surface to create a textured surface for increasing adhesion of materials deposited thereon during substrate processing. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Collins et al. and Loewenhardt et al. so as to texture the interior surface of the liner in order to increase adhesion of materials deposited thereon during substrate processing.

Claims 25-26 and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Lee, U.S. Patent 5,616,208 or Masuda et al., U.S. Patent 6,171,438 and further in view of Reimold et al., DE 31 10489 A1.

Shan et al. shows the invention substantially as claimed including a thermally controlled apparatus for lining a processing region defined at least partially by sidewalls and a bottom of a processing chamber, comprising: an annular aluminum base having a perimeter, for substantially covering the bottom of the processing chamber; and a first

cylindrical wall extending from the perimeter of the base, wherein the first cylindrical wall comprises a lip extending radially inwards in a spaced-apart relation to the base.

Shan et al. does not expressly disclose a first boss and a second boss projecting from the base, the first boss comprising a hole in fluid communication with the passage at an inlet of the passage, and the second boss comprising a hole in fluid communication with the passage at an outlet of the passage, wherein the first boss and the second boss are configured to extend throughout the processing chamber. Lee discloses using an annular heat medium passage (123,129) isolated from the process volume and formed so as to prevent deposition on the surfaces exposed to plasma, wherein the passage is formed at least partially in the base and the passage is adapted to fluidly isolate a heat transfer fluid flowing through the base (see fig. 1 and its description). Alternatively, Masuda et al. discloses an apparatus comprising a liner 103 having a heat exchanging medium supply means 104 isolated from the process volume to control the temperature of the side wall 102. In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. by supplying a heat transfer medium through the liner because this allows for the formation of a strong polymerized film on the exposed walls and reduces instances of flaking or, alternatively, so as to control the temperature of the surfaces exposed to the gases (plasma) because this will prevent the deposition of by-products on the exposed walls.

With respect to the use of bosses, Reimold discloses the use of bosses for providing connection for the supply or the removal of a heat exchanging medium (see

equivalent abstract). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use bosses in the apparatus of Shan et al. modified by Lee or Masuda et al. in order to provide connection for the supply and removal of the heat exchanging medium.

Concerning claim 30, note that Shan et al. also includes a second cylindrical wall coupled to an inner portion of the base.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Lee, U.S. Patent 5,616,208 or Masuda et al., U.S. Patent 6,171,438 as applied to claims 25-26 and 28-31 above, and further in view of Banholzer et al., U.S. Patent 5,565,058.

Shan et al., Lee, and Masuda et al. are applied as above but do not expressly disclose that the liner comprises a textured surface. Banholzer et al. discloses a vacuum chamber comprising a liner that is treated to roughen its surface to create a textured surface for increasing adhesion of materials deposited thereon during substrate processing. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Lee and Masuda et al. so as to texture the interior surface of the liner in order to increase adhesion of materials deposited thereon during substrate processing.

Claims 33 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Lee, U.S. Patent 5,616,208 or Masuda et al., U.S. Patent 6,171,438.

Shan et al. shows the invention substantially as claimed including a thermally controlled apparatus for lining a processing region defined at least partially by sidewalls and a bottom of a processing chamber, comprising: an annular aluminum base having a perimeter, for substantially covering the bottom of the processing chamber; and a first cylindrical wall extending from the perimeter of the base for extending into the processing region along the sidewalls of the chamber and adapted to line at least a portion of the walls of the processing chamber; a center section (top center part of member 10) coupled to one end of the cylindrical section, the cylindrical section and the center section being exposed to the processing region and comprising a single piece structure, for substantially covering an upper surface of the chamber; a second cylindrical wall coupled to an inner portion of the base for extending into the processing region along a substrate support positioned therein; wherein the first cylindrical wall comprises a ridge/lip extending radially from the first cylindrical wall toward the second cylindrical wall in a spaced-apart relation to the base; a lid 24 disposed opposite the cylindrical wall, the lid and the wall defining a plenum at least partially therebetween (see fig. 1); a plurality of nozzles disposed in the center member providing fluid access to the plenum; a gas feedthrough fluidly coupled to the plenum through a hole disposed in the lid. For a complete description of the apparatus see fig. 1, page 3-line 20 to page 4-line 45, and page 9, lines 7-46.

Shan et al. does not expressly disclose a substantially annular passage formed at least partially in the base, the passage being fluidly isolated from the processing region. Lee discloses using an annular heat medium passage (123,129) isolated from the process volume and formed so as to prevent deposition on the surfaces exposed to plasma, wherein the passage is formed at least partially in the base and the passage is adapted to fluidly isolate a heat transfer fluid flowing through the base (see fig. 1 and its description). Alternatively, Masuda et al. discloses an apparatus comprising a liner 103 having a heat exchanging medium supply means 104 isolated from the process volume to control the temperature of the side wall 102. In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. by supplying a heat transfer medium through the first and second cylindrical walls, the base and the center section because this allows for the formation of a strong polymerized film on the exposed walls and reduces instances of flaking and/or to control the temperature of the surfaces exposed to the gases (plasma) because this will prevent the deposition of by-products on the exposed walls.

Claims 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Miyamoto, U.S. Patent 5,846,331.

Shan et al. shows the invention as claimed including a thermally controlled apparatus for lining a processing region at least partially defined by walls of a processing chamber, comprising: a cylindrical liner section adapted to line at least a

portion of the walls of the processing chamber; a center section (top center part of member 10) coupled to one end of the cylindrical section, the cylindrical section and the center section being exposed to the processing region and comprising a single piece structure, for substantially covering an upper surface of the chamber; a flange (top outer part of member 10); wherein the inner wall is cylindrical and projects from the center member inside of the flange and a passage disposed in the center member having an inlet and an outlet (see fig. 1); a lid 24 disposed opposite the cylindrical wall, the lid and the wall defining a plenum at least partially therebetween (see fig. 1); a plurality of nozzles disposed in the center member providing fluid access to the plenum; a gas feedthrough fluidly coupled to the plenum through a hole disposed in the lid (see page 4, lines 25-27). For a complete description of the apparatus see fig. 1, page 3-line 20 to page 4-line 45, and page 9, lines 7-46.

Shan et al. fails to expressly disclose a substantially annular passage formed in the center member, and having an inlet and an outlet adapted to circulate a fluid through the passage, wherein the passage is fluidly isolated from the processing volume. Miyamoto discloses forming a substantially annular passage 5 in a center member, and having an inlet and an outlet adapted to circulate a fluid through the passage, where the passage is isolated from the processing volume (see fig. 2 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. so as to include the annular passage of Miyamoto because this will allow for controllability of the temperature of the upper portion of the chamber.

Claims 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., EP 0 814 495 in view of Masuda et al., U.S. Patent 6,171,438.

Shan et al. shows the invention as claimed including a thermally controlled apparatus for lining a processing region at least partially defined by walls of a processing chamber, comprising: a cylindrical liner section adapted to line at least a portion of the walls of the processing chamber; a center section (top center part of member 10) coupled to one end of the cylindrical section, the cylindrical section and the center section being exposed to the processing region and comprising a single piece structure, for substantially covering an upper surface of the chamber; a flange (top outer part of member 10); wherein the inner wall is cylindrical and projects from the center member inside of the flange and a passage disposed in the center member having an inlet and an outlet (see fig. 1); a lid 24 disposed opposite the cylindrical wall, the lid and the wall defining a plenum at least partially therebetween (see fig. 1); a plurality of nozzles disposed in the center member providing fluid access to the plenum; a gas feedthrough fluidly coupled to the plenum through a hole disposed in the lid (see page 4, lines 25-27). For a complete description of the apparatus see fig. 1, page 3-line 20 to page 4-line 45, and page 9, lines 7-46.

Shan et al. fails to expressly disclose a substantially annular passage formed in the base, and having an inlet and an outlet adapted to circulate a fluid through the passage, wherein the passage is fluidly isolated from the processing volume. Masuda et al. discloses an apparatus comprising a liner 103 having a heat exchanging medium

supply means 104 to control the temperature of the sidewall 102. In view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. by supplying a heat transfer medium through the liner because this allows for the formation of a strong polymerized film on the exposed walls.

Response to Arguments

Applicant's arguments with respect to claims 11-26, 28-33, and 35 have been considered but are moot in view of the new ground(s) of rejection. However, the declaration under 37 CFR 1.131 is effective to overcome the rejection under 35 USC 102(a) and 35 USC 103 using Pu et al. WO '130.

Concerning the rejection of claims 36-39 under 35 USC 103 over Shan et al. in view of Lee, Masuda et al. or Miyamoto, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, the examiner respectfully submits that the limitations of claims 36-39 are rendered prima facie obvious over the combinations of the above mentioned references.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-

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1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro
Primary Examiner
Art Unit 1763

March 6, 2006